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and Malagasy. This view is opposed to the theory that the original Melanesian stock is distinct from that to which the Malay and Polynesian belong. Dr. Tylor seems to fall in with this view, since he says: "The Melanesian and Polynesian languages are of one family, but the Melanesian preserves earlier and more perfect forms, the Polynesian being a group of much broken down and comparatively modern dialects spread recently by emigrants." On the other hand Professor Keane suggested that if Mr. Codrington is correct in assuming the original unity of Malayo-Polynesian and Melanesian speech, all our conclusions regarding the relative value of physical and linguistic types will have to be reconsidered. The theory of Mr. Codrington is that of the elder Von der Gabelentz; but the younger (George) Von der Gabelentz and Dr. A. B. Meyer recognize in their "Beiträge zur Kenntniss der Melanesischen, Mikronesischen, und Papuanischen Sprachen" (Leipzig, 1882), the presence of at least two organic linguistic elements, a Melanesian or Papuan, and a Malayo-Polynesian in the Oceanic world.

ARCHÆOLOGICAL FRAUDS.—The NATURALIST for some years has strenuously and continuously warned archæological collectors against giving factitious values to relics. It is this craze to have more and prettier stone implements than his neighbor that leads the rich collector to put a higher value upon specimens than they merit. In the first number of Revue d'Ethnographie for 1884, Dr. Charles Rau, Curator of Antiquities in the National Museum at Washington, publishes a statement over his signature that the collections of M. S. Valentine, exhibited and applauded in many cities of Europe two years ago, are frauds. Dr. Rau adds that he discredited the specimens when they were in Washington, but had no proof against them save his own opinion. The case is now changed, and the men who made Valentine's objects have actually produced a duplicate set for the Smithsonian, and they are deposited in the National Museum.

MICROSCOPY.[1]

SOME LABORATORY APPLIANCES.—1. *Water-bath apparatus for paraffine.*—The laboratory appliances for the use of students and others engaged in work requiring the employment of imbedding processes will, of necessity, vary considerably with the judgment and taste of those concerned.

The apparatus in use for some time past in the embryological laboratory of the Mus. Comp. Zoöl. at Harvard College, may offer suggestions to those who contemplate fitting up laboratories for such purposes.

There are many advantages in having a water-bath for each person instead of a common tank for all the students in a laboratory. The outlay is somewhat greater at first, and the increased consumption of gas makes the expense still more, but both are more than counterbalanced by the advantages of having all one's materials close at hand, and of being free from the unavoidable interference incident to the use of common property.

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[1] Edited by Dr. C. O. WHITMAN, Mus. Comparative Zoölogy, Cambridge, Mass.

The water-bath employed is that which was introduced by Paul Mayer[1] at the Naples Zoölogical Station, with slight modifications which will be described below.

The operations are more conveniently managed if the top of the water-bath is nearly on a level with the top of the work-table. If it is supported on a tripod standing on the table, it is too high to be easily watched, and cuts off light from the table unnecessarily. It is easier as well as safer to adjust the distance between the bottom of the water-bath and the gas jet by making the latter rather than the former movable.

These considerations have led to the adoption of the following arrangement. The bath is supported (Fig. 1) on a wrought-iron bracket of the form indicated in Fig. 1 *b*, firmly screwed to the end "bed-piece" of the work-table in such a position as to leave twenty-five or thirty millimeters space between the front edge of the table and the water-bath, the top and end of which are respectively even with the top and end of of the table. The bath is thus practically at one's elbow without interfering with the ordinary operations.

The bracket is made of heavy band iron, about 25 × 3^{mm}, bent into a rectangular form (Fig. 1 *b*) a little shorter than the bath, and securely riveted, as shown in the cut. A piece of sheet iron of the size of the bottom of the water-bath is placed under it as a guard, from which any accumulation of soot may be readily removed. The bath resting on the guard is secured against accidental displacement by passing, at each end, a copper wire through the oven in the bath and winding it securely around the bracket.

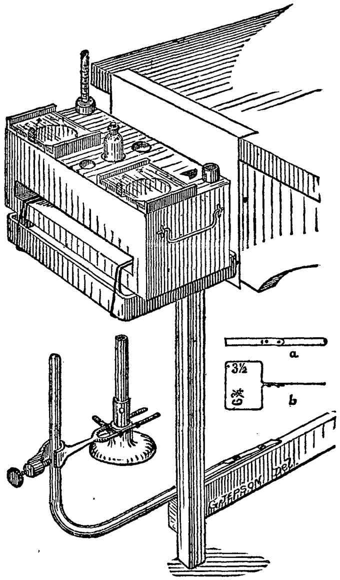

FIG. 1.

The gas burner is carried by a fork support which clamps to a 12^{mm} round iron, and may therefore be readily adjusted to any desired distance from the bath. The rod is bent at right angles and screwed to a cross-piece connecting the legs of the table near the floor. The tubing leading from the gas pipe at the wall is not shown in the figure. The stop-cock in the gas pipe should be within easy reach of one sitting at the table.

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[1] AM. NAT., Vol. XVI, p. 785, Oct., 1882.

Lest the heat of the gas flame should char the table in the vicinity, a sheet of zinc is tacked to the *under* side (not to the upper side, as shown in the figure) of the table top.

The paraffine water-bath, of which Fig. 2 gives a truthful representation, is made of tin-lined burnished copper, is about 18^{cm} long, 9^{cm} broad and 8^{cm} high, and has an oven near the bottom for warming slides. The oven is 1^{cm} high and 12^{cm} long. The single cylinder soldered to one end of the Naples bath to serve as a handle, has been replaced by a strong brass wire handle at each end. When not in use the handles are turned down out of the way. The water space communicates with the outside through only one opening, the "chimney," which is shorter (12^{cm}) than in the Naples form. The whole is therefore more compact and may be more readily packed for transportation to the sea-side or elsewhere.

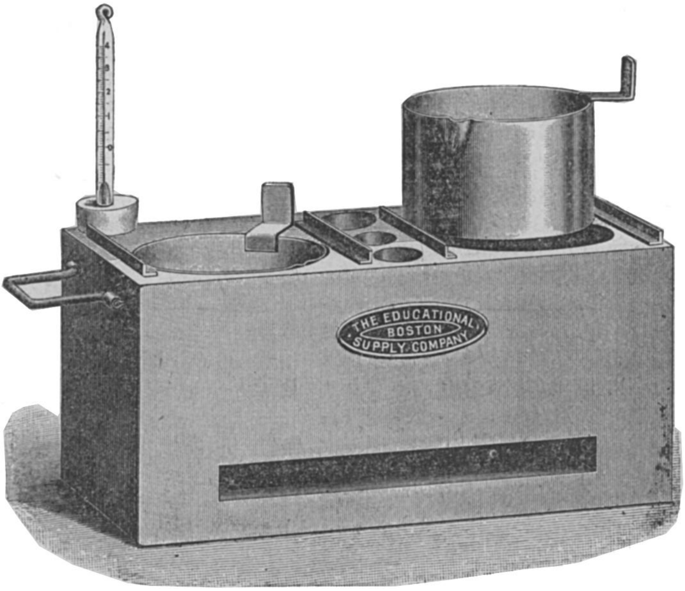

FIG. 2.

There are two large and four smaller copper-lined wells in the top. All but one of these are 4^{cm} deep, the remaining one, in the corner, is 7^{cm} deep. The two larger wells are 6^{cm} in diameter and receive each a copper tank, one for soft, the other for hard paraffine. Each is provided with a firm brass handle bent at right angles, the horizontal arm being from the lip of the tank about 12^{cm}long; the perpendicular arm is of about the same length. The nose for pouring out the paraffine is so fashioned, by reëntrant folds of the lip on either side of it, that it does not necessitate a "well" larger than the tank; the latter therefore fits snugly in the well.

But in imbedding ordinarily small objects, it is quite unnecessary to remove the tank. It is much more convenient to *dip* the melted paraffine into the mold by means of a metallic ladle previously heated for an instant in the flame of an alcohol lamp. The silver-plated deep-bowl "mustard spoons" of the shops answer the purpose admirably and are inexpensive. On either side of the two large wells copper ledges are soldered for the support of a glass plate which protects the paraffine from dust and is prevented from displacement by the chimney (or the thermometer) at one end, and the handle of the cup at the other (Fig. 2). The ledge is from one to two millimeters thick, and thus allows room for the handles of as many ladles as one wishes to keep immersed in the melted paraffine.

These ladles, which are almost indispensable, are readily fashioned out of *soft* copper wire of from one to two millimeters diameter. If the wire is thicker it can be flattened where it emerges from the tank under the glass cover. The wire, cut to the proper length, should have one end evenly rounded with the file. The rounded end is then to be beaten on a smooth anvil by light, rapid taps with a *smooth*-faced hammer until it is broad and thin. If carefully done the wire will have an even, bright surface,[1] and then may be easily fashioned into a trough- or spoon-shaped ladle by gradually indenting one side by rubbing it with the blunt, rounded, polished end of some hard object while it rests upon a piece of soft pine or cork. The ladle once formed, the wire serves as a handle, and may be bent in any desired manner.

It is very desirable that the object to be imbedded, especially if small, should not be allowed to rest on the bottom of the tank, since with the greatest care there will always be more or less sediment,[2] and since it also is difficult to raise delicate objects when once they are allowed to rest upon the bottom. For these reasons ladles to support the objects are very serviceable. It plated with silver or nickel, the smaller objects are more readily distinguishable. If the bowl of the ladle is allowed to rest upon the bottom of the tank, it is more liable to become contaminated by the sediment than if it is suspended a little above the bottom. There is also greater danger of overheating the object, when the bath is quickly heated up, if the ladle is in contact with the bottom. The copper-wire ladles may be easily suspended by giving the portion which projects above the edge of the tank the proper curves. The simplest way is to turn the wire into a flat spiral of three or four turns, leaving the terminal ten or twelve millimeters to project from the center of the coil as a handle perpendicular to the plane of the spiral. If sufficient distance is left between the coil and the edge of the tank, the weight of the coil will overbalance the weight of the obliquely placed ladle end of the wire, and the latter may be made to occupy any depth in the paraffine by slightly altering the angle which the wire makes at the lip of the tank (Fig. 3).

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[1] Spatulæ for transferring sections and small objects are quickly made in the same way, and may be sufficiently silvered by being dipped first in weak nitric acid and then in a one per cent aq. sol. of silver nitrate. When dry, polish. Repeat the silver bath if necessary.

[2] The most satisfactory way of removing sediment is to allow the bath to cool very gradually to the congealing point of the paraffine, in order to allow the impurities to settle completely, and when quite cold to remove the tank and heat it quickly all over in the flame of a spirit lamp. The paraffine in immediate contact with the tank is thus quickly melted without softening the whole cake, which may then be removed (upon the end of a stout needle thrust into it obliquely) and cleaned by paring off as much of the bottom as is discolored. Before returning the cake to the tank, the latter should be again heated, and while still hot the remnant of paraffine attached to its sides should be removed by thoroughly rubbing the inside of the tank with a piece of clean paper, which is less liable to leave lint behind than a cloth would be.

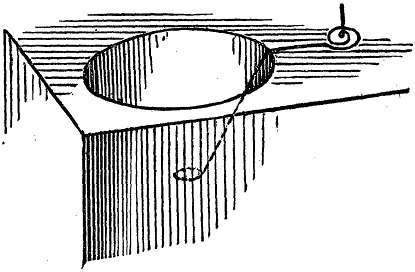

FIG. 3.

Of the smaller wells three, including the deeper one at the corner, are eighteen millimeters in diameter, and are designed to accommodate two-drachm "homœopathic vials." The corner well may be used for a thermometer or, if it be preferred to insert the latter directly into the water through the chimney, for a longer vial. The fourth of the smaller wells has a diameter of twenty-four millimeters, and is intended for a mercurial gas regulator or for a larger vial, as occasion requires. It occupies the side toward the table in Fig. 1, where it is represented too small.

This paraffine water-bath, including the two copper tanks and a short thermometer (0°–100° C.), is to be had of the Educational Supply Co., No. 6 Hamilton place, Boston, Mass., for $8.00; without the thermometer for $6.50.

2. Orienting Larger Objects in Paraffine.—In imbedding smaller objects the orientation is facilitated by employing some such instrument as Zeiss's dissecting microscope, but for larger objects a simpler contrivance answers every purpose. The glass plate upon which the imbedding is to be performed is placed on top of an ordinary glass dish—5^{cm} deep and 10^{cm} in diameter is a convenient size—at the bottom of which a small mirror is so adjusted as to make an angle of a little less than 45° with the horizon. With the mirror turned toward the window the light traversing the sides of the dish is reflected upward, and renders the outlines of the object sufficiently distinct for most purposes of orientation.

3. Dissecting Pans.—The most satisfactory material for the "filling" to dissecting pans is undoubtedly bees-wax, and for ordinary purposes it should be made black by having *thoroughly* stirred into it while melted a quantity of lamp-black. This mass, "run" into suitably-shaped tin pans—provided with narrow ledges soldered to the inside just below the prospective surface of the wax, to prevent its floating in the dissecting fluid—is serviceable for a time, but is destined sooner or later to become worthless, owing to the inevitable rusting of the pan. Fortunately there have come into the market, within a year or two, heavy glass dishes (they are of various proportions) with short legs at the four corners, which are suitable in shape for dissecting pans. They present the advantages of admitting more light upon the object and of not rusting. The wax may be prevented from floating in the dissecting fluid by pouring into the melted wax in the dish a sufficient quantity of shot to give the desired specific gravity to the whole mass. Since these dishes are apparently cast in molds and are presumably not of the best quality of glass, some care should be used to prevent breakage. This can be readily accomplished by floating the glass dish in a pan of water, and gradually raising the temperature of the water to near the boiling point. The hot wax then poured into the glass will not be likely to break it. A convenient size, 25^{cm} by 15^{cm} and about 5^{cm} deep, retails for about forty cents, and can probably be had from most of the glass dealers. Mr. M. G. Cochrane, of Clark, Adams & Clark, 65 Franklin street, Boston, can supply them.

When the surface of the wax has become impaired, it may be restored either by remelting the whole or, more quickly, by directing the flame from a gas burner downward upon the surface, whereby enough can be melted to accomplish the object.

Dissecting-trays of various shapes to suit special objects may be made by excavating thick blocks of the wax, or by sawing out from a thick board with a fret-saw a piece of the desired shape. A thin board nailed over one side of the hole thus made, forms the bottom of the tray. This is to be partially filled with the melted wax, which may be made to coat the sides of the tray to any desired thickness by simply tilting the tray while the wax is in a fluid condition. Any irregularities may be repaired by careful use of the gas jet.—*E. L. Mark, Mus. Comp. Zoöl., Cambridge.*